ST-2950S

E Model

FM STEREO/FM-AM TUNER

SPECIFICATIONS

GENERAL

Power Requirements: 110, 127, 220 or 240 V ac ~, adjustable, 50/60 Hz

Power Consumption: 23 W

Dimensions: Approx. 390 (w) x 145 (h) x 310 (d) mm
15 3/8 (w) x 5 3/4 (h) x 12 1/4 (d) inches
Including projecting parts and controls

Weight: Approx. 6.0 kg, 13 lb 4 oz (net)
Approx. 7.8 kg, 17 lb 2 oz (in shipping carton)

FM SECTION

Tuning Range: 87.5 MHz – 108 MHz

Antenna Terminals: 300 Ω, balanced
75 Ω, unbalanced

Intermediate Frequency: 10.7 MHz

Sensitivity at 50 dB Quieting: 4.0 μV (MONO)
50 μV (STEREO)

Usable Sensitivity: 2.0 μV (IHF)

S/N Ratio: 73 dB (MONO)
68 dB (STEREO)

Harmonic Distortion:
at 100 Hz 0.2% (MONO) 0.3% (STEREO)
at 1 kHz 0.2% (MONO) 0.3% (STEREO)
at 10 kHz 0.2% (MONO) 0.6% (STEREO)

IM Distortion: 0.2% (MONO)
0.3% (STEREO)

Separation: 35 dB at 100 Hz
40 dB at 1 kHz
35 dB at 10 kHz

Frequency Response: 30 Hz – 15 kHz $^{+0.5}_{-2.0}$ dB

Alternate Channel Selectivity: 50 dB (400 kHz)

Capture Ratio: 1.0 dB

AM Suppression Ratio: 54 dB

Image Response Ratio: 45 dB

IF Response Ratio: 90 dB

Spurious Response Ratio: 75 dB

– to be continued on next page –

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SONY®

SERVICE MANUAL

RF Intermodulation: 60 dB

Sub-carrier Product Ratio: 50 dB

Muting Threshold: Approx. 5 μV

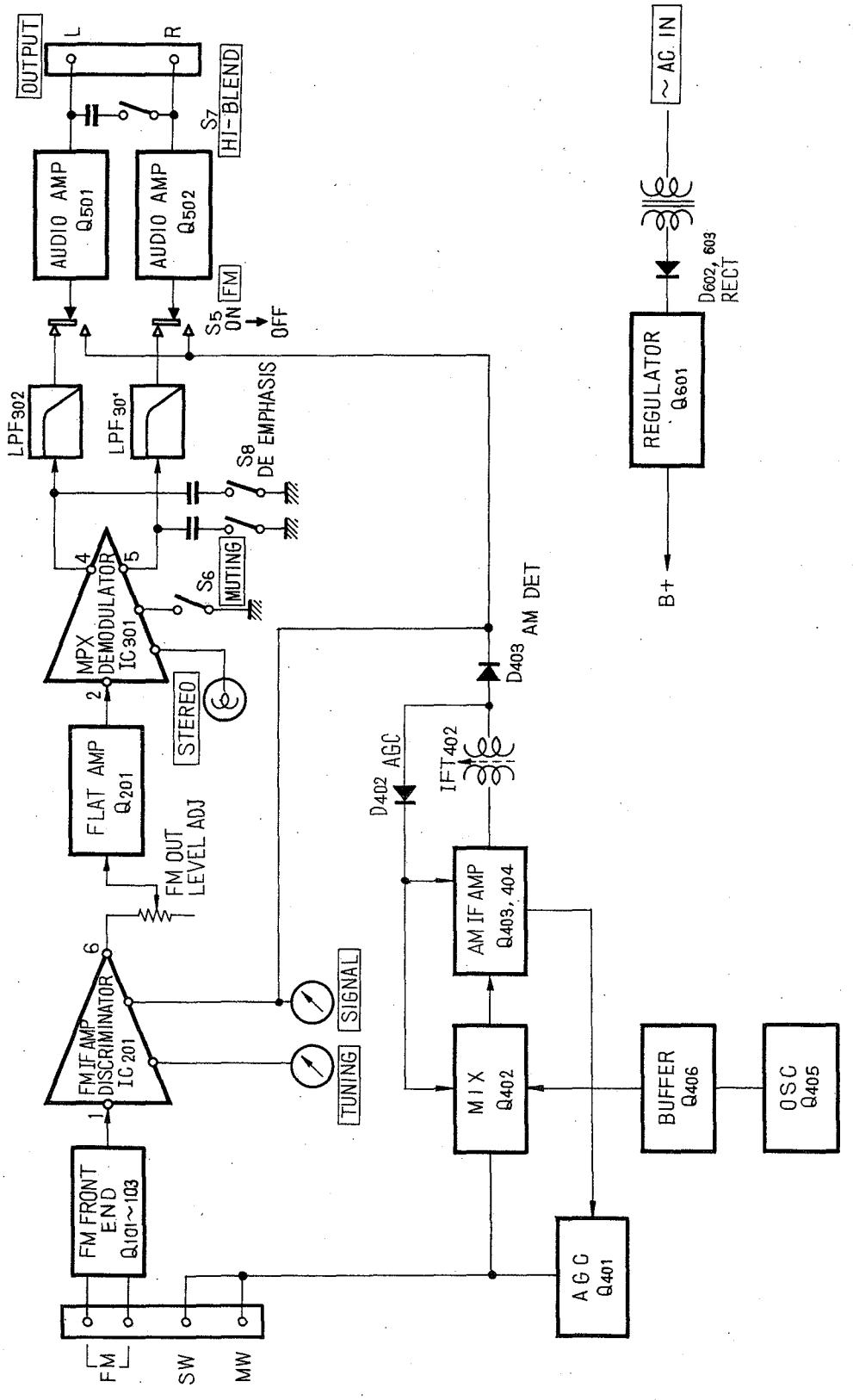
Output Level/impedance: 750 mV, 5 kΩ at 100 % modulation

AM (MW and SW) SECTION

		MW	SW1	SW2
Tuning Range		530 kHz – 1,605 kHz	2.3 MHz – 6 MHz	6 MHz – 18 MHz
Antenna	built-in	provided	none	none
	external	provided	provided	provided
Intermediate Frequency		455 kHz		
Usable Sensitivity	built-in antenna	250 μV/m (1,000 kHz)	——	——
	external antenna	100 μV (1,000 kHz)	20 μV (4 MHz)	30 μV (12 MHz)
S/N Ratio		50 dB (50 mV/m)	50 dB (5 mV)	50 dB (5 mV)
Harmonic Distortion		0.5 % (50 mV/m, 400 Hz)	0.5 % (5 mV, 400 Hz)	0.5 % (5 mV, 400 Hz)
Selectivity		50 dB (10 kHz)	45 dB (10 kHz)	45 dB (10 kHz)

SECTION 1

BLOCK DIAGRAM



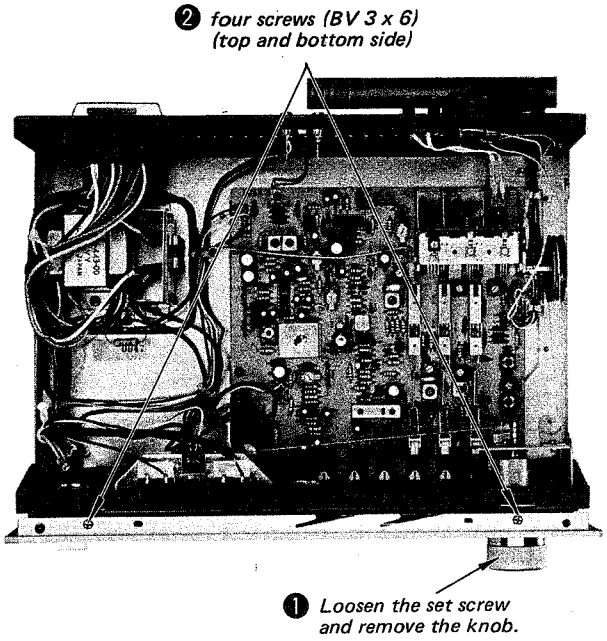
SECTION 2

DISASSEMBLY AND REPLACEMENT

1. SIDE BOARD REMOVAL

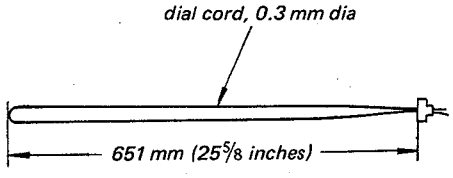
Remove four screws (⊕ BW 4 x 22) on the ornamental side boards (L, R).

2. FRONT PANEL REMOVAL

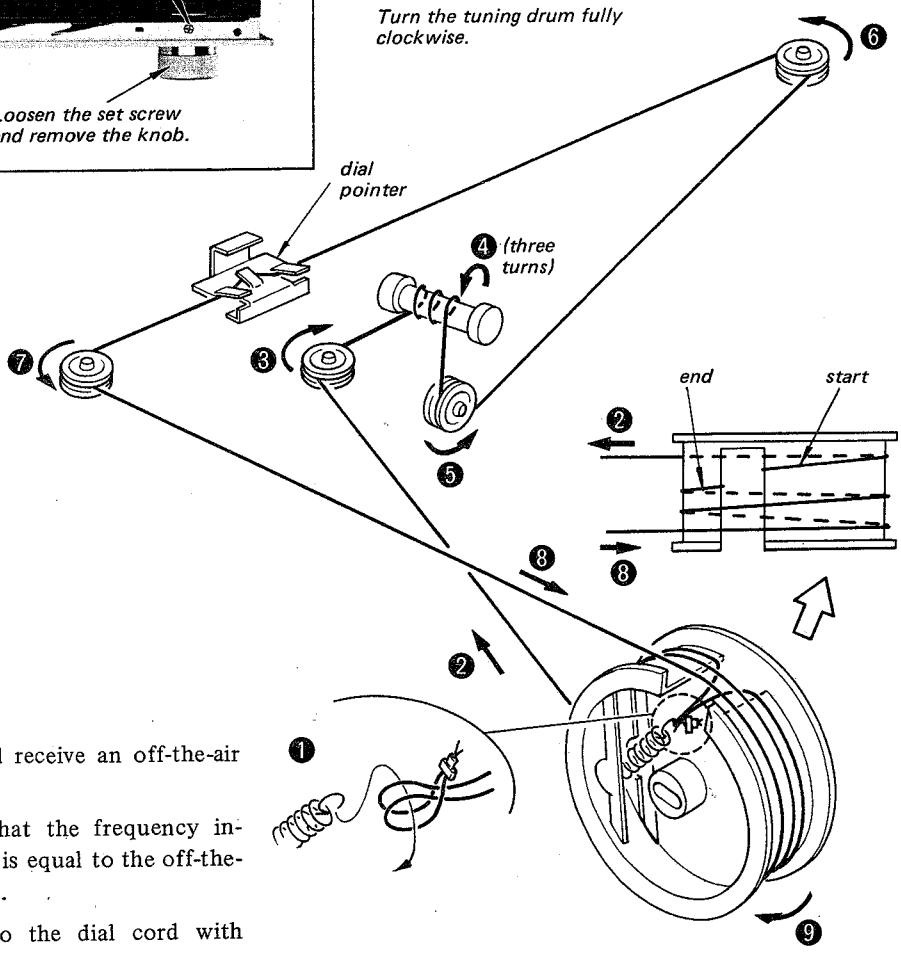


3. DIAL CORD STRINGING

1) Dial Cord Preparation



2) Dial Cord Stringing



3) Dial Pointer Setting

1. Turn the tuning drum and receive an off-the-air signal.
2. Set the dial pointer so that the frequency indicated by the dial pointer is equal to the off-the-air signal's carrier frequency.
3. Secure the dial pointer to the dial cord with locking compound.

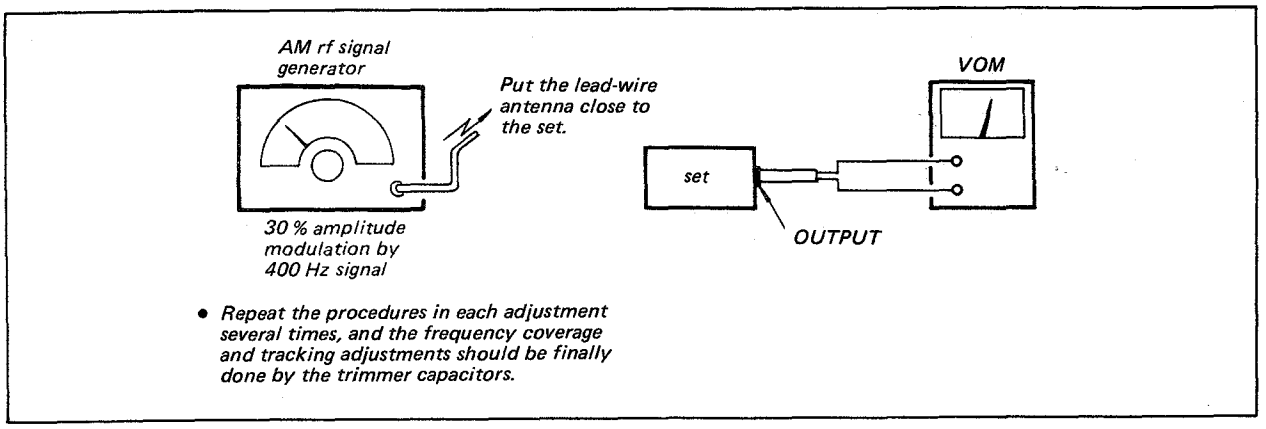
SECTION 3
ALIGNMENTS AND ADJUSTMENTS

FM FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

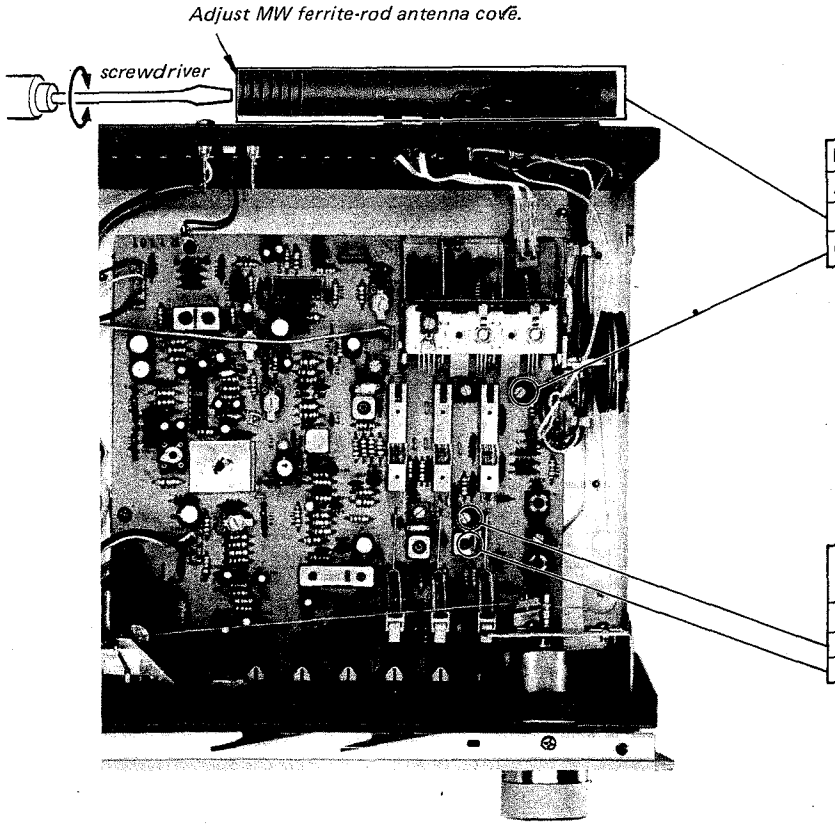
Never attempt alignment of the fm front-end section for the fm frequency coverage and tracking adjustment. If the fm frequency coverage and tracking adjustments are required, consult the factory service center.

MW/SW FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Setup:

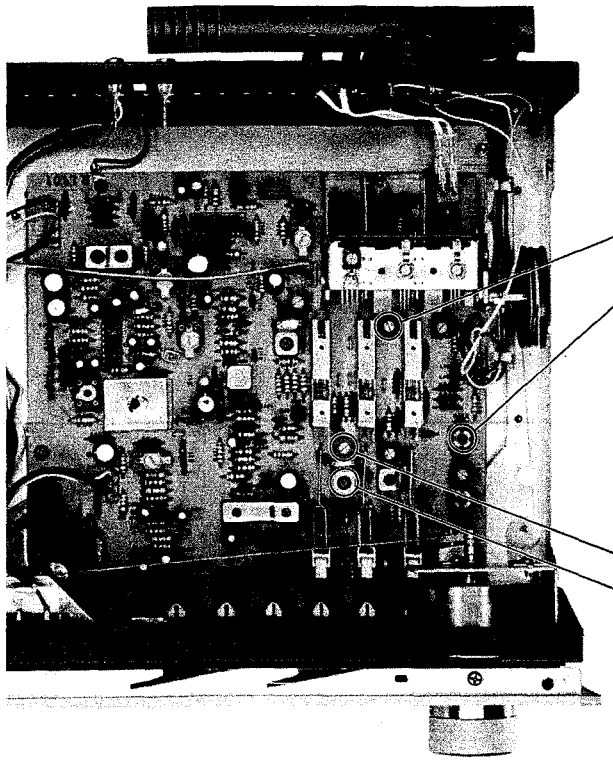


- *Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.*



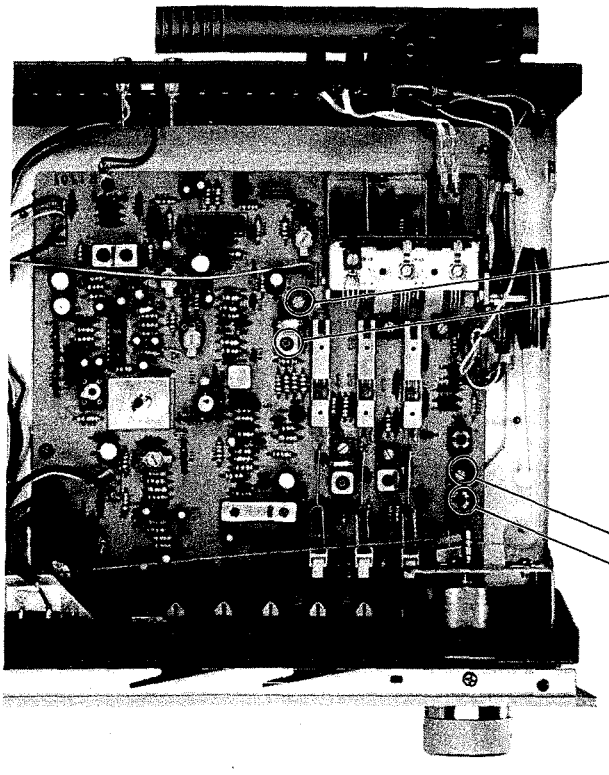
MW TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM.	
L701	600 kHz
CT403	1,400 kHz

MW FREQUENCY COVERAGE ADJUSTMENT	
Adjust for a maximum reading on VOM.	
CT406	1,605 kHz
L407	530 kHz



SW1 TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM.	
CT402	6 MHz
L404	2.3 MHz

SW1 FREQUENCY COVERAGE ADJUSTMENT		DIAL INDICATION
Adjust for a maximum reading on VOM.		———
CT405	6 MHz	6 MHz
L406	2.3 MHz	2.3 MHz



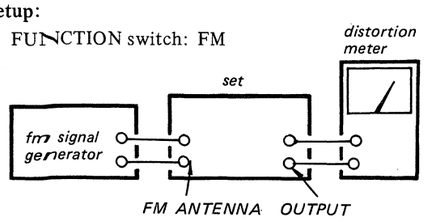
SW2 FREQUENCY COVERAGE ADJUSTMENT		DIAL INDICATION
Adjust for a maximum reading on VOM.		———
CT404	18 MHz	18 MHz
L405	6 MHz	6 MHz

SW2 TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM.	
CT401	18 MHz
L403	6 MHz

FM IF ALIGNMENT

Setup:

FUNCTION switch: FM



FM Signal Generator Setting:

Carrier frequency:	98 MHz
Modulation:	400 Hz, 75 kHz deviation (100 %)
Output level:	1 mV (60 dB)

Procedure:

Tune the set to 98 MHz and adjust the primary-side core (black) of IFT201 for a minimum distortion reading.

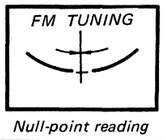
FM DISCRIMINATOR ALIGNMENT

Setup:

FUNCTION switch: FM

Procedure:

1. Detune the set.
2. Turn the secondary-side core (blue) of IFT201 for null-point reading on the FM TUNING meter.

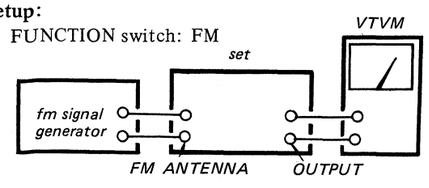


Null-point reading

FM OUTPUT LEVEL ADJUSTMENT

Setup:

FUNCTION switch: FM

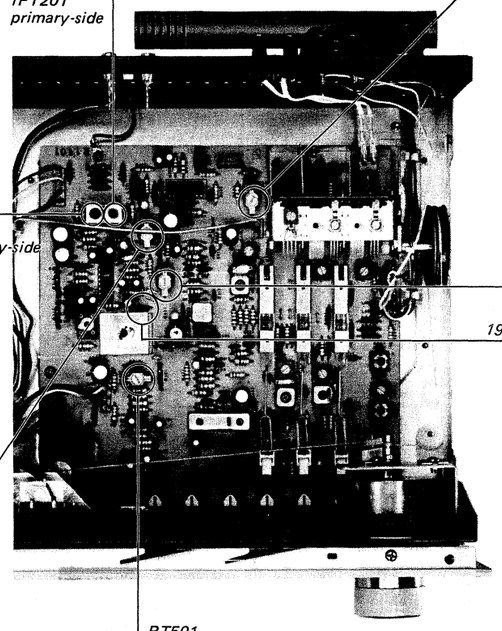


FM Signal Generator Setting:

Carrier frequency:	98 MHz,
Modulation:	400 Hz, 75 kHz deviation (100 %)
Output level:	1 mV (60 dB)

Procedure:

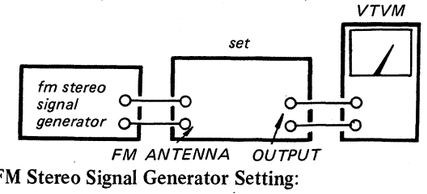
Adjust RT202 for 0.775 V (0 dB) reading on the VTVM.



FM STEREO SEPARATION ADJUSTMENT

Setup:

FUNCTION switch:	FM
MUTING/MODE switch:	ON/STEREO



FM Stereo Signal Generator Setting:

Main carrier frequency:	98 MHz
Output level:	1 mV (60 dB)
Mode:	Stereo
Audio (400 Hz) Mod:	67.5 kHz deviation (90 %)
Pilot (19 kHz) Mod:	7.5 kHz deviation (10 %)

Procedure:

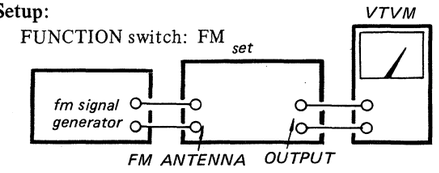
FM stereo signal generator modulated channel	VTVM connection	VTVM reading
L-CH	L-CH	Ⓐ
R-CH	L-CH	Ⓑ Adjust RT501 for minimum reading.
R-CH	R-CH	Ⓒ
L-CH	R-CH	Ⓓ Adjust RT501 for minimum reading.

The difference of the separations Ⓐ – Ⓑ and Ⓒ – Ⓓ should be within 3 dB.

SIGNAL METER CALIBRATION

Setup:

FUNCTION switch: FM

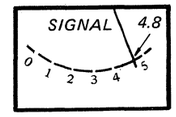


FM Signal Generator Setting:

Carrier frequency:	98 MHz
Modulation:	400 Hz, 75 kHz deviation (100 %)
Output level:	1 mV (60 dB)

Procedure:

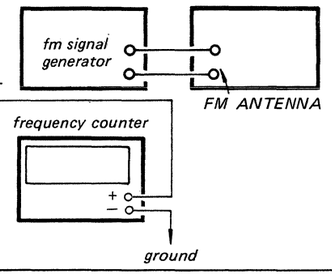
Tune the set to 98 MHz and adjust RT201 for specified pointer position (See figure below.) on the SIGNAL meter.



19 kHz ADJUSTMENT

Setup:

FUNCTION switch:	FM
MUTING/MODE switch:	ON/STEREO



FM Signal Generator Setting:

Carrier frequency:	98 MHz
Modulation:	no modulation
Output level:	1 mV (60 dB)

A) With Frequency Counter

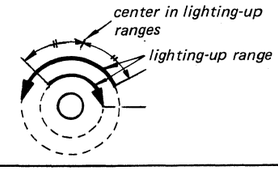
Procedure:

1. Tune the set to 98 MHz.
2. Adjust RT301 for 19 kHz ± 100 Hz on the counter.

B) Without Frequency Counter

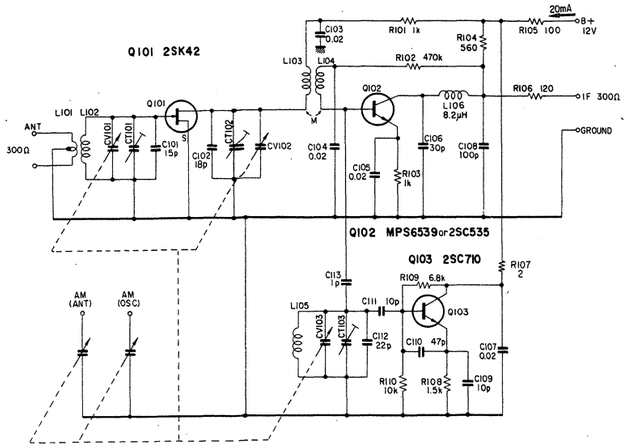
Procedure:

1. Tune the set to the FM stereo broadcasting signal.
2. Turn RT301 clockwise or counterclockwise and memorize the lighting-up range of stereo lamp.
3. Secure RT301 at the center in lighting-up range of both turns as shown below.



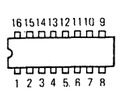
SECTION 4
DIAGRAMS

4-1. SCHEMATIC DIAGRAM
— Front-end Section —

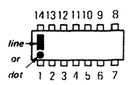


Note: [ ] : replacement part

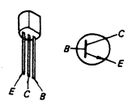
IC201: HA1137W



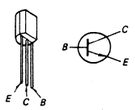
IC301: HA1156W



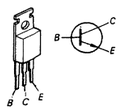
Q201
Q501, 502: 2SC900



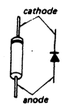
Q401 ~ 406: 2SC710



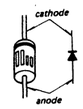
Q601: 2SC1173



D201, 301
D401, 402: 1S1555
D202: 1T40 [1S1555]
D403: 1T22A
D602, 603: 10E2

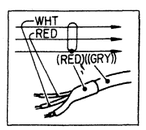


D601: EQA01-16R

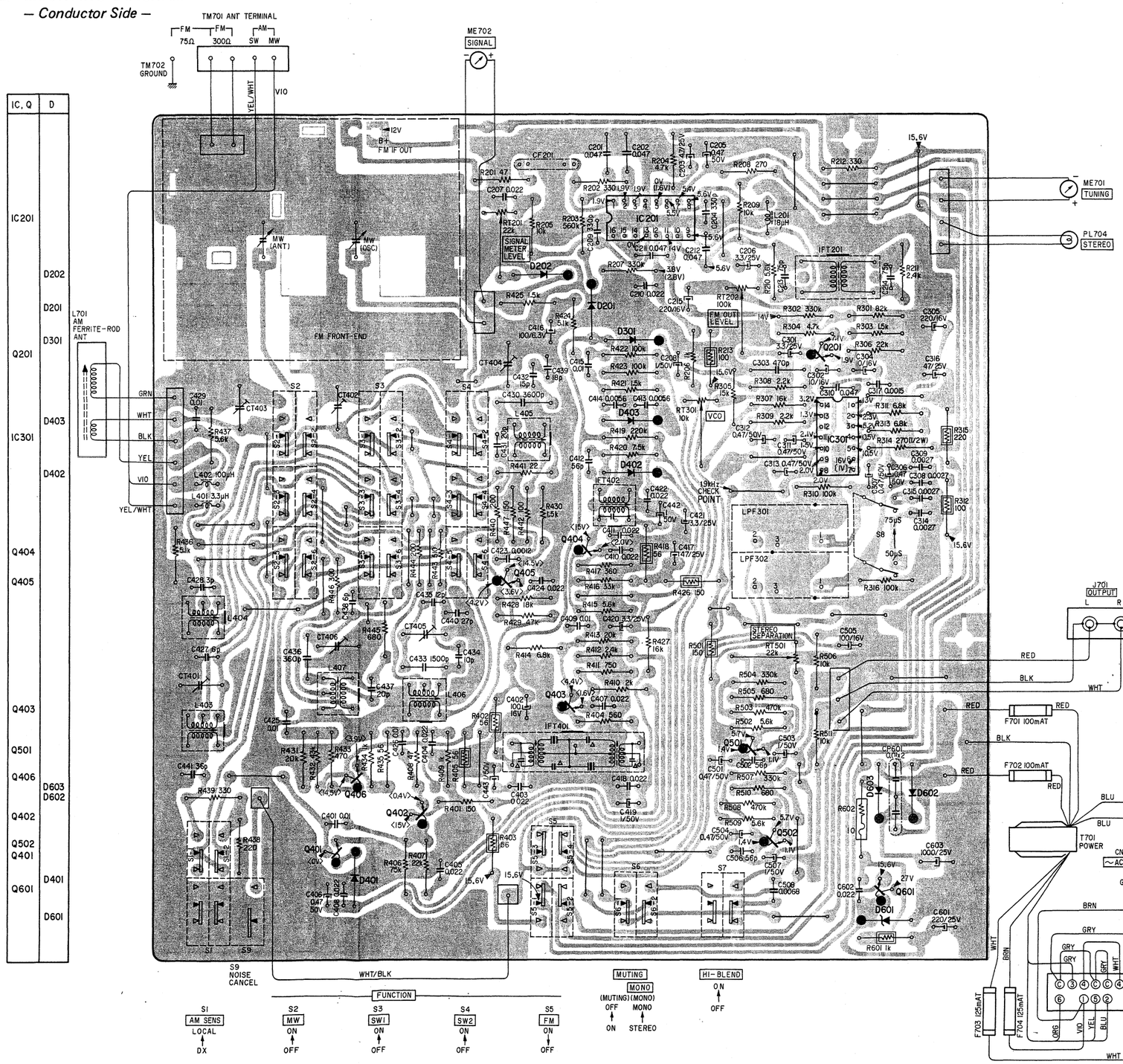


Note:

- [ ] shows the location of stencilled part number. Refer to this mark when replacing the parts.
- ▭ : B+ pattern

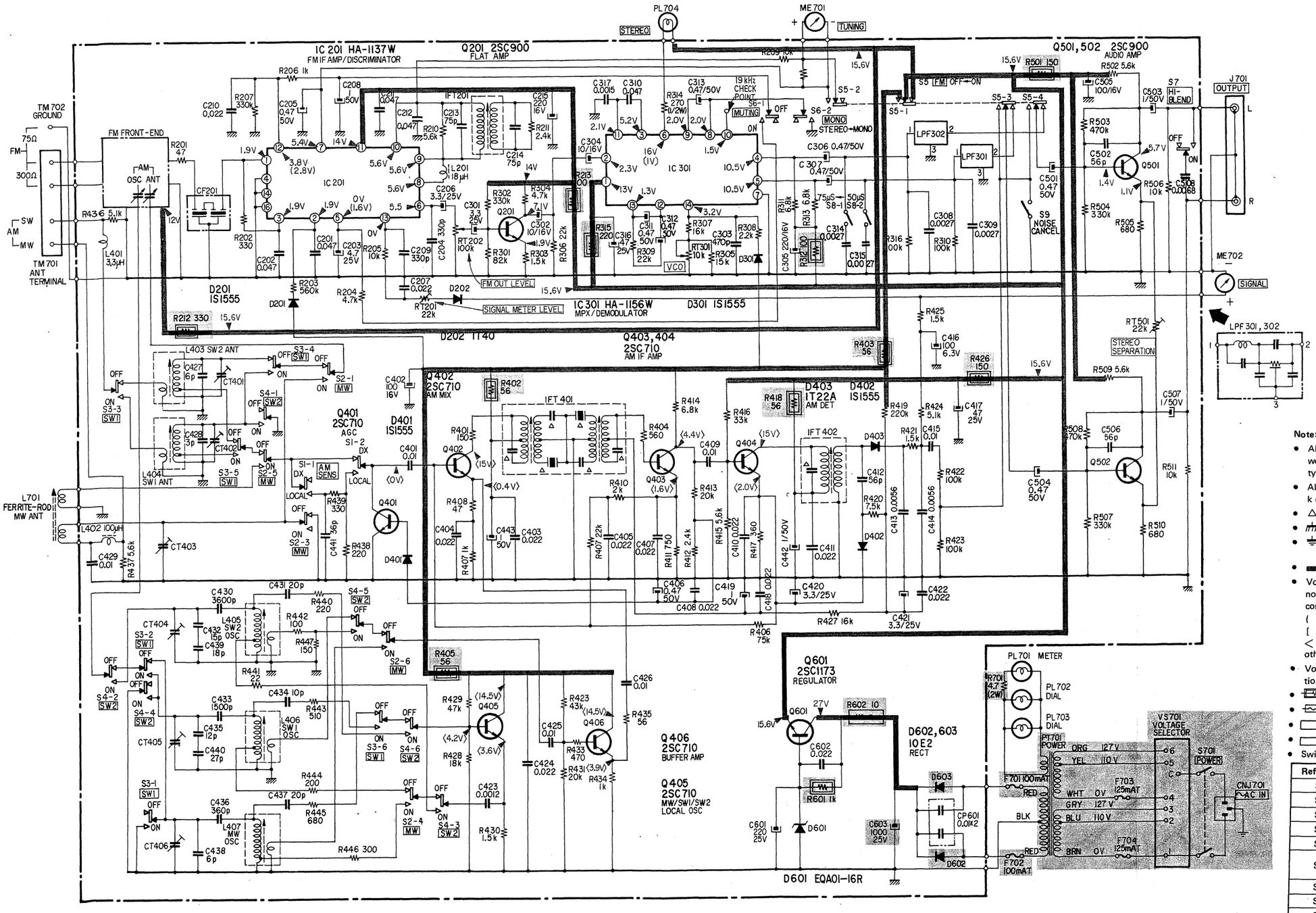


4-2. MOUNTING DIAGRAM
— Conductor Side —



Note: The components identified by shading are critical for safety. Replace only with part number specified.

4-3. SCHEMATIC DIAGRAM



Note:

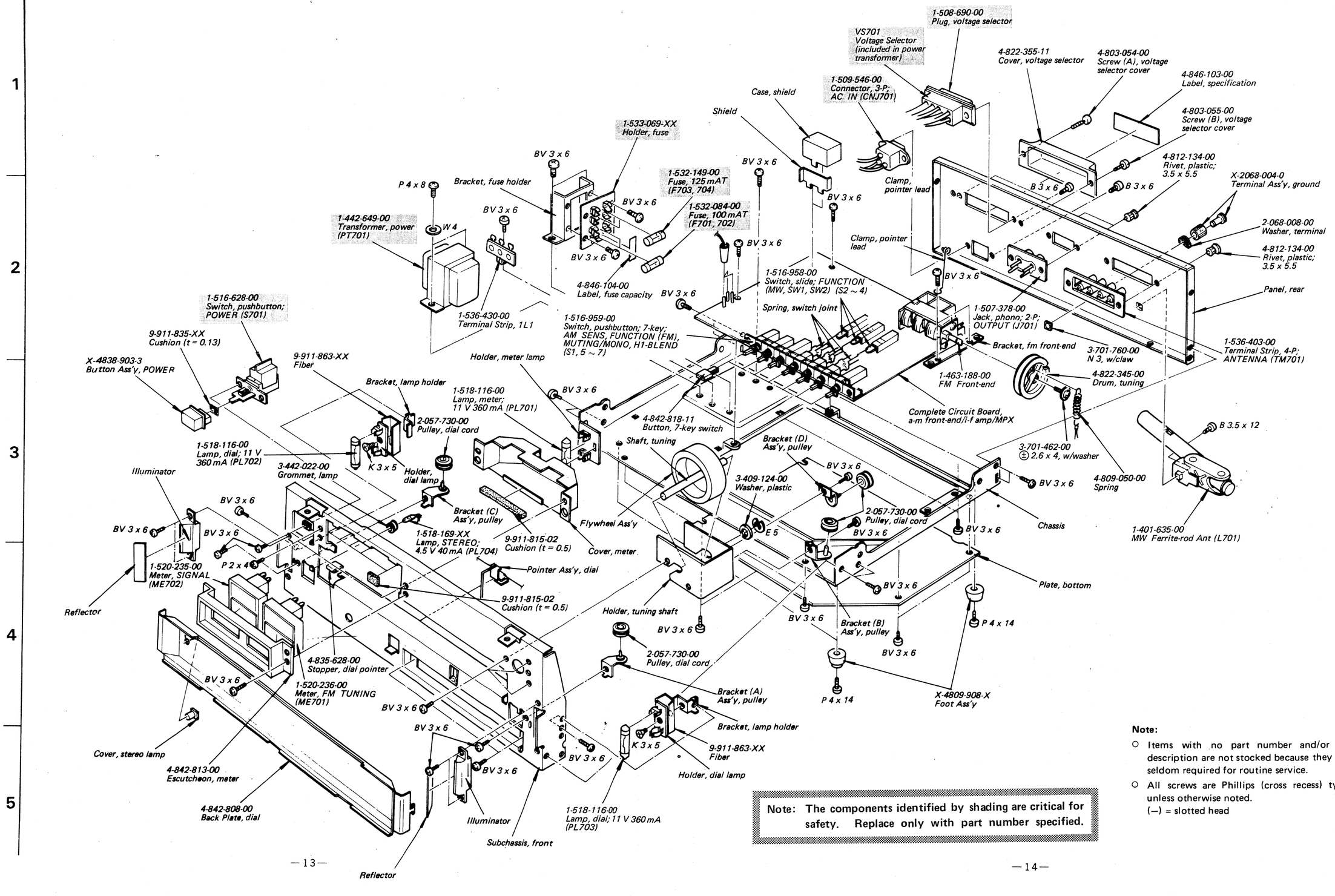
- All capacitors are in μF unless otherwise noted. 50 or less working voltages are not indicated except for electrolytic type. p = μμF.
- All resistors are in Ω, ¼ W, unless otherwise noted. k = 1,000 M = 1,000 k
- △ indicates internal components.
- ⏚ indicates chassis ground.
- ⏚ direct connection to points marked ⏚ on the chassis.
- ▬ indicates B+ circuit.
- Voltages are DC with respect to ground unless otherwise noted. Readings are taken under no-signal (FM detuned) conditions with a VOM (20 kM/V).
  ( ) : FM mode and Muting switch "ON".
  [ ] : FM STEREO mode
  < > : AM mode
  other no mark : FM mode
- Voltage variations may be noted due to normal production tolerances.
- ▭ indicates nonflammable resistor.
- ▭ indicates fusible resistor.
- ▭ indicates designation on the panel.
- ▭ indicates the adjustment for repair.
- Switch Mode:

Ref. No.	Switch	Position
S1	AM SENS	DX
S2	MW	OFF
S3	SW1	OFF
S4	SW2	OFF
S5	FM	ON
S6	MUTING	ON
	MONO/STEREO	STEREO
S7	HI-BLEND	OFF
S8	DE-EMPHASIS	50μs
S701	POWER	OFF

SECTION 5

EXPLODED VIEWS

5-1.

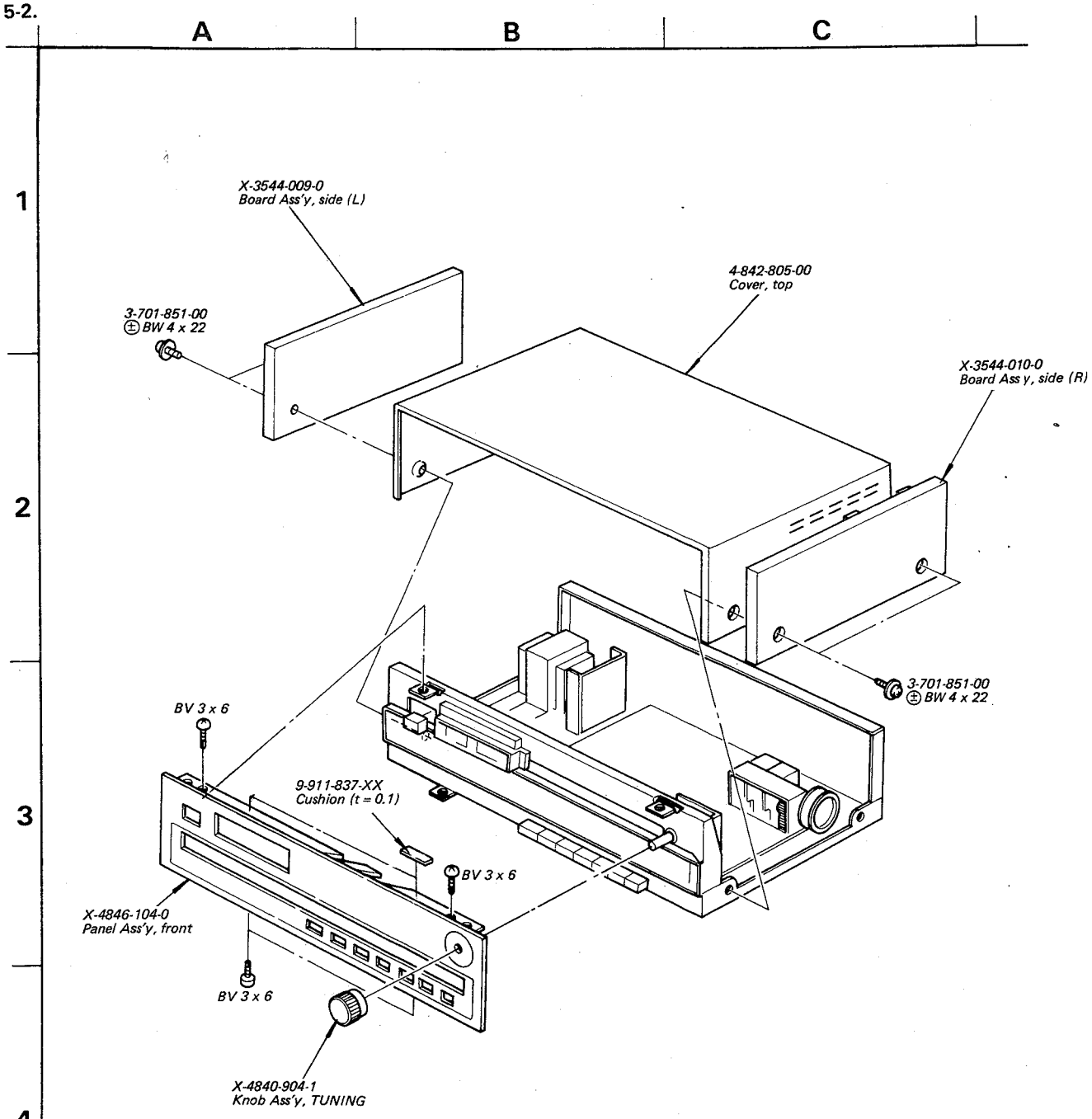


Note: The components identified by shading are critical for safety. Replace only with part number specified.

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (—) = slotted head

5-2.



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head

SECTION 6

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
		SEMICONDUCTORS
		Transistors
⇒Q201		2SC632A
Q401～406		2SC710
⇒Q501, 502		2SC632A
Q601		2SC1173
		ICs
IC201		HA1137W
IC301		HA1156W
		Diodes
D201		1S1555
⇒D202		1S1555
D301		1S1555
D401, 402		1S1555
D403		1T22A
D601		EQA01-16R
D602, 603		10E2
		COILS
L201	1-407-741-00	Microinductor, 18 μH
L401	1-407-184-XX	Microinductor, 3.3 μH
L402	1-407-169-XX	Microinductor, 100 μH
L403	1-401-663-00	SW2 Ant
L404	1-401-668-00	SW1 Ant
L405	1-405-730-00	SW2 Osc
L406	1-405-734-00	SW1 Osc
L407	1-405-732-00	MW Osc
L701	1-401-635-00	MW Ferrite-rod Ant
		TRANSFORMERS
IFT201	1-404-029-00	FM Discriminator
IFT401	1-403-963-00	AM IFT
IFT402	1-403-149-00	AM IFT
PT701	1-442-649-00	Power

Ref. No.	Part No.	Description
		FILTERS
CF201	1-527-240-91	Ceramic
LPF301, LPF302	1-231-303-00	Low-pass
		CAPACITORS

All capacitors are in μF and ceramic unless otherwise noted.
50 WV or less are not indicated except for electrolytics.
pF = μμF, elect = electrolytic

C201, 202	1-101-925-11	0.047		
C203	1-121-395-11	4.7	25 V	elect
C204	1-102-112-11	330 p		
C205	1-121-726-11	0.47	50 V	elect
C206	1-121-392-11	3.3	25 V	elect
C207	1-101-924-11	0.022		
C208	1-121-391-11	1	50 V	elect
C209	1-102-112-11	330 p		
C210	1-101-924-11	0.022		
C211, 212	1-101-925-11	0.047		
C213, 214	1-102-732-11	75 p		
C215	1-121-421-11	220	16 V	elect
C301	1-121-392-11	3.3	25 V	elect
C302	1-121-651-11	10	16 V	elect
C303	1-103-717-11	470 p		polystyrol
C304	1-121-651-11	10	16 V	elect
C305	1-121-421-11	220	16 V	elect
C306, 307	1-121-726-11	0.47	50 V	elect
C308, 309	1-108-830-12	0.0027		mylar
C310	1-108-845-12	0.047		mylar
C311～313	1-121-726-11	0.47	50 V	elect
C314, 315	1-108-830-12	0.0027		mylar
C316	1-121-410-11	47	25 V	elect
C317	1-108-827-12	0.0015		mylar
C401	1-101-923-11	0.01		
C402	1-121-415-11	100	16 V	elect
C403～405	1-101-924-11	0.022		
C406	1-121-726-11	0.47	50 V	elect

⇒: Due to replacement parts, the descriptions are different from the diagrams.

Note: The components identified by shading are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description		
C407, 408	1-101-924-11	0.022		
C409	1-101-923-11	0.01		
C410, 411	1-101-924-11	0.022		
C412	1-101-884-11	56 p		
C413, 414	1-108-834-12	0.0056		mylar
C415	1-108-837-12	0.01		mylar
C416	1-121-413-11	100	6.3 V	elect
C417	1-121-410-11	47	25 V	elect
C418	1-101-924-11	0.022		
C419	1-121-391-11	1	50 V	elect
C420, 421	1-121-392-11	3.3	25 V	elect
C422	1-101-924-11	0.022		
C423	1-108-826-12	0.0012		mylar
C424	1-101-924-11	0.022		
C425, 426	1-101-923-11	0.01		
C427	1-102-943-11	6 p		
C428	1-102-936-11	3 p		
C429	1-108-837-12	0.01		mylar
C430	1-103-738-11	3600 p		polystyrol
C431	1-102-958-11	20 p		
C432	1-102-292-11	15 p		
C433	1-103-729-11	1500 p		polystyrol
C434	1-102-947-11	10 p		
C435	1-102-289-11	12 p		
C436	1-103-714-11	360 p		polystyrol
C437	1-102-958-11	20 p		
C438	1-102-943-11	6 p		
C439	1-102-296-11	18 p		
C440	1-102-306-11	27 p		
C441	1-102-964-11	36 p		
C442	1-121-391-11	1	50 V	elect
C443	1-121-391-11	1	50 V	elect
C501	1-121-726-11	0.47	50 V	elect
C502	1-101-884-11	56 p		
C503	1-121-391-11	1	50 V	elect
C504	1-121-726-11	0.47	50 V	elect
C505	1-121-415-11	100	16 V	elect
C506	1-101-884-11	56 p		
C507	1-121-391-11	1	50 V	elect
C508	1-108-835-12	0.0068		mylar
C601	1-121-422-11	220	25 V	elect
C602	1-108-841-12	0.022		mylar
C603	1-121-657-11	1000	25 V	elect
CP601	1-102-355-11	(0.01	500 V) x 2	

Ref. No.	Part No.	Description
CT401, 403, CT405, 406	1-141-147-00	Trimmer
CT402, 404	1-141-138-XX	Trimmer

RESISTORS

All resistors are in ohms. Common ¼ W carbon resistors are omitted. Check schematic diagram for values.

R212	1-211-534-11	330	¼ W	carbon (nonflammable)
R213	1-211-522-11	100	¼ W	carbon (nonflammable)
R312	1-211-522-11	100	¼ W	carbon (nonflammable)
R314	1-202-559-11	270	½ W	composition
R315	1-211-530-11	220	¼ W	carbon (nonflammable)
R402, 403, R405, 418	1-211-516-11	56	¼ W	carbon (nonflammable)
R426	1-211-526-11	150	¼ W	carbon (nonflammable)
R501	1-211-526-11	150	¼ W	carbon (nonflammable)
R601	1-211-935-11	1 k	¼ W	carbon (nonflammable)
R602	1-217-523-11	10	¼ W	fusible
R701	1-206-455-11	4.7	2 W	wirewound
RT201	1-222-764-11	22 k, adjustable		
RT202	1-222-766-11	100 k, adjustable		
RT301	1-222-752-11	10 k, adjustable		
RT501	1-222-764-11	22 k, adjustable		

SWITCHES

S1, 5～7	1-516-959-00	Pushbutton, 7-key; AM SENS, FUNCTION (FM), MUTING/ MONO, HI-BLEND
S2～4	1-516-958-00	Slide, FUNCTION (MW, SW1, SW2)
S8	1-516-954-00	De-emphasis
S9		Noise Cancel, included in S1
S701	1-516-628-00	Pushbutton, POWER
VS701		Voltage Selector, included in power transformer

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Note: The components identified by shading are critical for safety. Replace only with part number specified.

Ref. No.	*Part No.*	*Description*
		MISCELLANEOUS
CNJ701	1-509-546-00	Connector, 3-p; AC IN
F701, 702	1-532-084-00	Fuse, 100 mAT
F703, 704	1-532-149-00	Fuse, 125 mAT
J701	1-507-378-00	Jack, phono; 2-p; OUTPUT
ME701	1-520-236-00	Meter, FM TUNING
ME702	1-520-235-00	Meter, SIGNAL
PL701～703	1-518-116-00	Lamp, 11 V 360 mA; meter, dial
PL704	1-518-169-XX	Lamp, 4.5 V 40 mA; STEREO
TM701	1-536-403-00	Terminal Strip, 4-p; ANTENNA
	1-463-188-00	FM Front-end
	1-508-690-00	Plug, voltage selector
	1-533-069-XX	Holder, fuse
	1-536-430-00	Terminal Strip, 1L1

ACCESSORIES & PACKING MATERIALS

Part No.	*Description*
X-4490-002-2	Cloth Ass'y, polishing
1-501-161-00	Ribbon Antenna, f-m
1-526-565-00	Adaptor, ac plug
1-534-049-61	Cord, connection; RK-74
1-534-492-00	Cord, SW antenna
1-534-754-00	Cord, power
3-770-051-11	Manual, instruction
4-818-924-00	Bag, plastic, set
4-842-711-00	Cushion
4-846-121-00	Carton

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